Docket No.: 12810-00323-US1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Tim Jungkamp et al.

Application No.: 10/586,452 | Confirmation No.: 4478

Filed: July 18, 2006 | Art Unit: 1626

For: METHOD FOR THE SEPARATION OF PENTENENITRILE ISOMERS | Examiner: J. R. Kosack

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on June 25, 2009, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

Appendix B Evidence
Appendix C Related Proceedings

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

BASF Aktiengesellschaft (BASF SE) of Ludwigshafen, Germany

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 14 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 0
2. Claims withdrawn from consideration but not canceled: 0
3. Claims pending: 1-14
4. Claims allowed: 0
5. Claims rejected: 1-14

C. Claims On Appeal

The claims on appeal are claims 1-14.

IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment After Final Rejection. The claims appealed herein are the claims of record, amended in the Response filed on January 5, 2009, and considered in the Final Office Action of March 30, 2009.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter relates to a process for separating mixtures of isomeric pentenenitriles, in which at least one isomer is depleted from the mixture. The process involves effecting the separation of the mixtures of isomeric pentenenitriles selected from the group consisting of mixtures comprising 2-methyl-3-butenenitrile and 3-pentenenitrile, mixtures comprising 2-methyl-3-butenenitrile and (Z)-2-methyl-2-butenenitrile, mixtures comprising cis-2-pentenenitrile and 3-pentenenitrile by distilling under a pressure of from 0.01 to 0.5 bar and mixtures comprising (E)-2-methyl-2-butenenitrile and 3-pentenenitrile by distilling under a pressure of from 0.02 to 0.5 bar.

The independent claim involved in the appeal is discussed at page 3, lines 1-15 and page 23, lines 14-18 and Table 6, and page 24, lines 10-14 and Table 8 of the specification.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A rejection for review on appeal is of claims 1-14 as obvious under 35 U.S.C. § 103(a) over Jungkamp et al. (WO 02/26698) ("Jungkamp").

VII. ARGUMENT

Jungkamp does not describe or suggest a process for separating mixtures of isomeric pentenenitriles, in which at least one isomer is depleted from the mixture, as recited in present claim 1.

An obviousness analysis under 35 U.S.C. § 103 requires, *inter alia,* consideration of the differences between prior art references and the claims at issue. *See KSR International Co. v. Teleflex Inc.,* 127 S.Ct. 1727 (2007) ("*KSR*") (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 86 S.Ct. 684 (1966) ("*Graham*") (describing factors that control an obviousness inquiry). In *Graham*, the U.S. Supreme Court ("Court") set forth the framework for applying the statutory language of 35 U.S.C. § 103, and in *KSR* the Court determined that the *Graham* factors were still useful and provided "helpful insight" to an obviousness inquiry. *KSR*, 127 S. Ct. at 1741. The Court further indicated that a "teaching, suggestion, motivation" to combine need not be explicit in every case. *Id.*

However, in making its obviousness determination, the Court indicated the importance of identifying a "reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Takeda Chem. Indus., v. Alphapharm Pty. Ltd.*, 492 F.3d 1350, 1356-57 (Fed. Cir. 2007) ("*Takeda*") (quoting *KSR*, 127 S. Ct. at 1731). In the chemical case *Takeda,* the U.S. Court of Appeals for the Federal Circuit concurred with the Court's reasoning by also emphasizing that there must be some identified reason that would have "prompted" a chemist to make a modification in a particular manner to establish *prima facie* obviousness. 492 F.3d at 1350.

Moreover, regarding chemical process claims, the Board of Patent Appeals and Interferences ("Board") recently explained that "in rejecting claims under 35 U.S.C. § 103, the [E]xaminer bears the initial burden of presenting a case of *prima facie* obviousness." (*See Ex parte Martin Haubner and Rolf Pinkos*, Appeal No. 2009-0449). (Internal citations omitted). The Board determined, contrary to the Examiner's assertions, that the evidence of record did not support a conclusion that the combination of references suggested the claimed process for preparing polyoxyalkylene glycols. *Id.* In particular, when considered as a whole, the primary reference applied in the rejections described different process steps, and indicated that certain steps recited in the claims at issue had an adverse effect. *Id.* Therefore, the Board found that the Examiner's indicated suggestion for combining the references was inadequate, and that the process claims at issue were unobvious over the references. *Id.*

In the present case, the Office has not demonstrated that Jungkamp describes or suggests the claimed process in light of the differences between the reference and the claimed invention; or shown that one skilled in the art would have been prompted to modify the reference to achieve the claimed process.

The differences between Jumpkamp and the claimed process are very apparent. For instance, in the claimed process, discussed *supra*, the process involves

> separating mixtures of isomeric pentenenitriles, in which at least one isomer is depleted from the mixture, which comprises effecting the separation of the *mixtures of isomeric pentenenitriles selected from the group consisting of*
>
> - mixtures comprising 2-methyl-3-butenenitrile and 3-pentenenitrile,

- mixtures comprising 2-methyl-3-butenenitrile and (Z)-2-methyl-2-butenenitrile,
- mixtures comprising cis-2-pentenenitrile and 3-pentenenitrile

by distilling under a pressure of from 0.01 to 0.5 bar and

- mixtures comprising (E)-2-methyl-2-butenenitrile and 3-pentenenitrile

by distilling under a pressure of from 0.02 to 0.5 bar.

Present claim 1. (Emphasis added).

The claimed process enables, in a technically simple and economically viable manner, the distillative separation of pentenenitrile isomers, in which the separation of the mixtures is effected distillatively under the above-recited *reduced pressure*.

Regarding Jumpkamp, the reference generally describes a process for separating isomeric pentenenitriles by extractive distillation by using a liquid diluent such as water. *See* Abstract and page 2, line 39 to page 3, line 6. Specifically, the distillation process involves separation of pentenenitrile isomers which have a relative volatility alpha ranging from 1.0 to 1.3 in a pressure range from 1 to 500 kPa, in which the distillation is carried out in the presence of a liquid diluent which forms with the pentenenitrile isomers, *under the same pressure conditions*. *See id.*

Moreover, as admitted by the Office, the reference does not teach "the exact pairs of isomers that are listed in claim 1 nor does [Jungkamp] teach the exact reactions that the mixtures come from." Final Office Action at page 4, lines 3-4. However, the Office has alleged that it would be obvious "to take the method proven by [Jungkamp] and apply it to other mixtures of pentenenitrile[s]" and that one would be able "to complete the distillation irrespective of which reaction the mixture of pentenetriles originated from." *Id.* at lines 5-11.

Contrary to the Office's allegations, Appellants point out that the reference does not indicate or suggest that the process can be merely applied to other mixtures of pentenenitriles. According to the reference, separation of the isomeric mixture by distillation causes considerable difficulties given that the relative volatility of certain pentenenitrile isomers range from 1.0 to 1.3 in a pressure range from 1 to 500 kPa. *See* page 2, line 39 to page 3, line 6. As such, when Jumpkamp is considered in its entirety, there is no description or suggestion of all of the above-described components of the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*,

721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) (indicating that prior art references must be considered in their entirely, as a whole, including any disclosures that lead away from the claims at issue).

Further, regarding mixtures comprising cis-2-pentenenitrile and 3-pentenenitrile, Appellants have shown in the examples of the present specification at page 23 "that, at the same reflux ratio and same removal rates, the lower the pressure in the column is set, the higher the efficiency with which the separation of trans-3-pentenenitrile and cis-2-pentenenitrile succeeds: at lower pressure, the residual content of trans-3-pentenenitrile in top draw decreases and the content of cis-2-pentenenitrile to be removed in the tops increases." *See* Table 6.

Regarding mixtures comprising 3-pentenenitrile and (E)-2-methyl-2-butenenitrile it is shown in the examples of the present specification at pages 23-24 "that, at the same reflux ratio and same removal rates, the lower the pressure in the column is set, the higher the efficiency with which the separation of trans-3-pentenenitrile and (E)-2-methyl-2-butenenitrile succeeds: at lower pressure, the residual content of (E)-2-methyl-2-butenenitrile in the bottom draw stream decreases and increases in the top draw stream." *See* Table 8.

In addition, it is noted at page 24 of the present specification that "for the achievement of a required specification of the particular pentenenitrile isomers in the bottom and top of the distillation column, when the distillation is performed under reduced pressure, fewer separating stages and/or less energy is needed than would be expected from the consideration of the known standard boiling points."

Jungkamp, on the other hand, does not describe or suggest the results achieved by the reduced pressures. Further, the Office has not shown or even provided any explicit analysis of why one skilled in the art would be led to modify the disclosure of Jungkamp to achieve the claimed process.

Therefore, in view of the above remarks and reasons explaining the patentable distinctness of the presently appealed claims over the prior art, Appellant requests that the pending 35 U.S.C. § 103(a) rejection be reversed.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Appellant on January 5, 2009.

If any fees are due with the filing of this appeal which were not submitted, please charge our Deposit Account No. 03-2775, under Order No. 12810-00323-US1 from which the undersigned is authorized to draw.

Dated: August 25, 2009

Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/586,452

1. (Previously Presented) A process for separating mixtures of isomeric pentenenitriles, in which at least one isomer is depleted from the mixture, which comprises effecting the separation of the mixtures of isomeric pentenenitriles selected from the group consisting of

- mixtures comprising 2-methyl-3-butenenitrile and 3-pentenenitrile,
- mixtures comprising 2-methyl-3-butenenitrile and (Z)-2-methyl-2-butenenitrile,
- mixtures comprising cis-2-pentenenitrile and 3-pentenenitrile

by distilling under a pressure of from 0.01 to 0.5 bar and

- mixtures comprising (E)-2-methyl-2-butenenitrile and 3-pentenenitrile

by distilling under a pressure of from 0.02 to 0.5 bar.

2. (Original) The process according to claim 1, wherein at least two different isomers are separated.

3. (Previously Presented) The process according to claim 1, wherein the mixture comprises 2-methyl-3-butenenitrile and 3-pentenenitrile and is produced from a reaction of 1,3-butadiene with hydrogen cyanide over a hydrocyanation catalyst.

4. (Original) The process according to claim 3, wherein the proportion of 2-methyl-3-butenenitrile in the mixture is from 0.1 to 99.9% by weight, based on the sum of all

pentenenitrile isomers in the mixture, and/or the proportion of 3-pentenenitrile in the mixture is from 0.1 to 99.9% by weight, based on the sum of the pentenenitrile isomers in the mixture.

5. (Previously Presented) The process according to claim 1, wherein the mixture comprises 2-methyl-3-butenenitrile and (Z)-2-methyl-2-butenenitrile and is produced from an isomerization of 2-methyl-3-butenenitrile.

6. (Original) The process according to claim 5, wherein the proportion of 2-methyl-3-butenenitrile in the mixture is from 0.1 to 99% by weight, based on the sum of the pentenenitrile isomers in the mixture, and/or the proportion of (Z)-2-methyl-2-butenenitrile in the mixture is from 0.1 to 99% by weight, based on the sum of the pentenenitrile isomers in the mixture.

7. (Previously Presented) The process according to claim 1, wherein the mixture comprises cis-2-pentenenitrile and 3-pentenenitrile and is produced from a reaction of 3-pentenenitrile with hydrogen cyanide over a hydrocyanation catalyst.

8. (Original) The process according to claim 7, wherein the proportion of cis-2-pentenenitrile in the mixture is from 0.1 to 99.9% by weight, based on the sum of pentenenitrile isomers in the mixture, and/or the proportion of 3-pentenenitrile in the mixture is from 0.1 to 99.9% by weight, based on the sum of the pentenenitrile isomers in the mixture.

9. (Previously Presented) The process according to claim 1, wherein the mixture comprises (E)-2-methyl-2-butenenitrile and 3-pentenenitrile and is produced from a reaction of 1,3-

butadiene with hydrogen cyanide over a hydrocyanation catalyst or from the isomerization of 2-methyl-3-buteneni trile or from a reaction of 3-pentenenitrile with hydrogen cyanide over a hydrocyanation catalyst.

10. (Original) The process according to claim 9, wherein the proportion of 3-pentenenitrile in the mixture is from 0.1 to 99.9% by weight, based on the sum of the pentenenitrile isomers in the mixture, and/or the proportion of (E)-2-methyl-2-butenenitrile in the mixture is from 0.1 to 99.9% by weight, based on the sum of the pentenenitrile isomers in the mixture.

11. (Previously Presented) The process according to claim 2, wherein the mixture comprises 2-methyl-3-butenenitrile and 3-pentenenitrile and is produced from a reaction of 1,3-butadiene with hydrogen cyanide over a hydrocyanation catalyst.

12. (Previously Presented) The process according to claim 2, wherein the mixture comprises 2-methyl-3-butenenitrile and (Z)-2methyl-2-butenenitrile and is produced from an isomerization of 2-methyl-3-butenenitrile.

13. (Previously Presented) The process according to claim 2 wherein the mixture comprises cis-2-pentenenitrile and 3-pentenenitrile and is produced from a reaction of 3-pentenenitrile with hydrogen cyanide over a hydrocyanation catalyst.

14. (Previously Presented) The process according to claim 2, wherein the mixture comprises (E)-2-methyl-2-butenenitrile and 3-pentenenitrile and is produced from a reaction of 1, 3-

butadiene with hydrogen cyanide over a hydrocyanation catalyst or from the isomerization of 2-methyl-3-butenenitrile or from a reaction of 3-pentenenitrile with hydrogen cyanide over a hydrocyanation catalyst.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.